

## REMARKS

In the Office Action, the Examiner allowed claims 17, and 37-38. Examiner further objected to claims 16 and 36 as being based on a rejected base claim, but wrote that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In the Office Action, the Examiner rejected claims 1-8, 10, 23-27, 29 and 32 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 4,553,034 issued to Byers et al. ("Byers") in view of U.S. patent 6,255,118 issued to Alfano et al. ("Alfano"). The Examiner further rejected claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 5,013,150 issued to Watts et al. ("Watts") in view of Alfano. The Examiner further rejected claims 23, 31 and 33-35 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 3,665,201 issued to Shea et al. ("Shea") in view of U.S. patent 4,072,424 issued to McMullan et al. ("McMullan"). The Examiner further rejected claims 12-17, and 20-21 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Alfano, in further view of Shea. The Examiner further rejected claims 9, 11, 28, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Alfano, in further view of U.S. patent 6,836,325 issued to Maczura et al. ("Byers"). The Examiner further rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Shea, in further view of a non-patent publication, Skoog Principles of Instrumental Analysis, 3<sup>rd</sup> Ed. Saunders College Publishing, 1985, p 19 ("Skoog"), in further view of Alfano.

In this Amendment, Applicants have amended claims 1, 12, 13, 18, 20, 23, and 33. Applicants have canceled claims 16 and 36. Accordingly, claims 1-15, 17-35 and 37-38 will be pending after entry of this Amendment.

**I. Allowance of claims 17 and 37-38**

Applicants thank the Examiner for allowing claims 17 and 37-38.

**II. Objection to claim 16 and rejection of claims 13-15 under 35 U.S.C. § 103(a)**

The Examiner rejected claims 13-15 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Shea and Alfano. Claims 14-15 depend directly or indirectly on claim 13. Claim 13 recites an apparatus for measuring fluorescence of a non-solid material that flows through two pipes. The apparatus has an adjoining member for connecting the first and second pipes. The adjoining member has a passageway that allows the non-solid material to flow from the first pipe to the second pipe. The adjoining member also has a chamber that on a first end is open and at a second end terminates on the passageway. The apparatus includes a fluorometer for inserting into the chamber to measure the fluorescence of the non-solid material. The fluorometer has a light emitting diode. The fluorometer and the adjoining member have corresponding threads for fastening the fluorometer and the adjoining member together.

The Examiner objected to claim 16 as being based on a rejected base claim, but wrote that it would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have canceled claim 16 and moved the relevant limitations to independent claim 13. The Examiner stated (see page 8 of the Office Action) that “the prior art of record taken alone or in combination fails to disclose a fluorometer or spectrometer for insertion into a system of pipes in which the threads for connecting the fluorometer and the adjoining member are present on the fluorometer and adjoining member, in combination with all the limitations of claims 16-17 and 36.”

Neither Byers, nor Shea, nor Alfano, nor any combination of them disclose, teach or suggest that the fluorometer and the adjoining member have corresponding threads for fastening

the fluorometer and the adjoining member together. In contrast, claim 13 as amended includes the limitation that the fluorometer and the adjoining member have corresponding threads for fastening the fluorometer and the adjoining member together. Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that Byers, Shea, Alfano, and any combination of them does not render claim 13 unpatentable. As claims 14-15 are dependent directly or indirectly on claim 13, Applicants respectfully submit that claims 14-15 are patentable over the combination of Byers and Shea for at least the reasons that were discussed above in relation to claim 13.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 13-15.

### **III. Objection to claim 36 and rejection of claims 33-35 under 35 U.S.C. § 103(a)**

The Examiner rejected claims 33-35 under 35 U.S.C. § 103(a) as being unpatentable over Shea in view of McMullan. Claims 34-35 depend directly or indirectly from claim 33. As amended claim 33 recites an apparatus for measuring light from a non-solid material that flows through two pipes. The apparatus has an adjoining member for connecting the first and second pipes. The adjoining member has a passageway that allows the non-solid material to flow from the first pipe to the second pipe. The adjoining member also has a chamber that on a first end is open and at a second end terminates on the passageway. The apparatus includes a spectrometer for inserting into the chamber to emit light towards the non-solid material and measure light from the non-solid material. The spectrometer has a light emitting diode. The spectrometer and the adjoining member have corresponding threads for fastening the spectrometer and the adjoining member together.

The Examiner objected to claim 36 as being based on a rejected base claim, but wrote that it would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have canceled claim 36 and moved the relevant limitations to independent claim 33. The Examiner stated (see page 8 of the Office Action) that “the prior art of record taken alone or in combination fails to disclose a fluorometer or spectrometer for insertion into a system of pipes in which the threads for connecting the fluorometer and the adjoining member are present on the fluorometer and adjoining member, in combination with all the limitations of claims 16-17 and 36.”

Shea describes a turbidimeter, but does not teach, disclose, or suggest a tube shaped housing containing the light source, the light detection circuit and a printed circuit board with electronic circuitry of the spectrometer. McMullan discloses a light source as an LED, but neither cited reference discloses, teaches, or suggests a tube shaped housing containing the listed items. In contrast, claim 33 as amended does include the limitations of a tube-shaped housing with the listed items. Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that the combination of Shea and McMullan does not render claim 33 unpatentable. As claims 34-35 are dependent directly or indirectly on claim 33, Applicants respectfully submit that claims 34-35 are patentable over the combination of Shea and McMullan for at least the reasons that were discussed above in relation to claim 33.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 33-35.

#### **IV. Rejection of claims 1-12 under 35 U.S.C. § 103(a)**

The Examiner rejected claims 1-8, and 10 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Alfano. The Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being

unpatentable over Byers in view of Shea and Alfano. The Examiner rejected claims 9 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Maczura and Alfano. Claims 2-12 depend directly or indirectly on claim 1. Claim 1 recites a fluorometer for measuring fluorescence of a non-solid material flowing through a system of pipes. The fluorometer has a housing with a distal end and the housing has a shape adapted to insert into the system of pipes. The fluorometer has a light source for passing light through the distal end towards the non-solid material. The light source is a light emitting diode. The fluorometer has a light detection circuit for receiving, through the distal end, light emitted from the non-solid material. The fluorometer has threads for fastening the fluorometer to an adjoining member, and the adjoining member has corresponding threads.

The Examiner previously approved the limitations of threads on a fluorometer adapted to fit into a system of pipes and corresponding threads on an adjoining member, as seen in claim 17 (see page 8 of Office Action). Applicant has amended claim 1 so that it contains these limitations.

Neither Byers, nor Alfano, nor any combination of Byers and Alfano, disclose threads on the fluorometer and an adjoining member. In contrast, claim 1 as amended includes the limitation “wherein the fluorometer has threads for fastening the fluorometer to an adjoining member, wherein the adjoining member has corresponding threads.” Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that the combination of Byers and Alfano does not render claim 1 unpatentable. As claims 2-8 and 10 are dependent directly or indirectly on claim 1, Applicants respectfully submit that claims 2-8 and 10 are patentable over the

combination of Byers and Alfano for at least the reasons that were discussed above in relation to claim 1.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 1-12.

**V. Rejection of claims 18 and 19 under 35 U.S.C. § 103(a)**

The Examiner rejected claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Watts in view of Alfano. Claim 19 depends directly from claim 18. Claim 18 recites a fluorometer for measuring fluorescence of a non-solid material. The fluorometer has first and second orifices on a side of the fluorometer that is to be placed next to the non-solid material. The fluorometer has a light source for passing light through the first orifice and onto the non-solid material. The light source is a light emitting diode. The fluorometer has a light detection circuit for receiving, through the second orifice, light emitted from the non-solid material. The fluorometer includes a tube shaped housing shaped to insert into a system of pipes. The tube shaped housing contains the light source, the light detection circuit, and a printed circuit board. The printed circuit board contains electronic circuitry of the fluorometer.

The Examiner stated in the Office action (about claim 37) that the prior art does not disclose a tube shaped housing shaped to insert into a system of pipes where the tube shaped housing contains the light source, detector, a printed circuit board, and the printed circuit board contains circuitry of the fluorometer. Applicants have added these limitations to claim 18.

Neither Watts nor Alfano, nor any combination discloses, teaches, or suggests a tube shaped housing, shaped to insert into a system of pipes, containing the light source, the light detection circuit, and a printed circuit board, where the printed circuit board contains electronic

circuitry of the fluorometer. In contrast, claim 18 as amended does include the limitations of a tube shaped housing, shaped to insert into a system of pipes, containing the listed items. Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that Watts does not render claim 18 unpatentable. As claim 19 is dependent directly on claim 18, Applicants respectfully submit that claim 19 is patentable over Watts for at least the reasons that were discussed above in relation to claim 18.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 18-19.

#### **VI. Rejection of claims 20-22 under 35 U.S.C. § 103(a)**

The Examiner rejected claims 20-21 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Shea. The Examiner also rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Maczura, in further view of Skoog, in further view of Alfano. Claims 21-22 depend directly on claim 20. Claim 20 recites a method of measuring fluorescence of a non-solid material flowing through a system of pipes. The method includes inserting the fluorometer into an adjoining member of the pipe system that connects two pipes in the system. The method also includes directing light from a light emitting diode in the fluorometer onto the non-solid material flowing between the two pipes. The method also includes collecting into the fluorometer the light emitted off the non-solid material. The method also includes, generating an electrical signal that is proportional to the fluorescence of the non-solid material, based on the collected light. The fluorometer and the adjoining member have corresponding threads for fastening the spectrometer and the adjoining member together.

Claim 20 is a method claim with limitations similar to claim 13 above. As in the case of

claim 13, Applicants have added to claim 20 the relevant limitations of (objected to) claim 16. The Examiner stated (see page 8 of the Office Action) that “the prior art of record taken alone or in combination fails to disclose a fluorometer or spectrometer for insertion into a system of pipes in which the threads for connecting the fluorometer and the adjoining member are present on the fluorometer and adjoining member, in combination with all the limitations of claims 16-17 and 36.”

Accordingly, Applicants respectfully submit that Byers, Shea, Alfano, and any combination of them does not render claim 20 unpatentable. As claims 21-22 are dependent directly on claim 20, Applicants respectfully submit that claims 20-22 are patentable over the combination of Byers and Shea for at least the reasons that were discussed above in relation to claim 20. Applicants do not surrender any equivalents of any amended limitations.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 20-22.

#### **VII. Rejection of claims 23-30, and 32 under 35 U.S.C. § 103(a) (Byers and Alfano)**

The Examiner rejected claims 23-27, and 29 under 35 U.S.C. § 103(a) as being unpatentable over Byers in view of Alfano. The Examiner rejected claims 28 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Byers and Alfano in view of Maczura. Claims 24-32 depend directly or indirectly on claim 23. Claim 23 recites a spectrometer for measuring light from a non-solid material flowing through a system of pipes. The spectrometer has a tube shaped housing with a distal end. The housing has a shape adapted to insert into the system of pipes. The spectrometer has a light source for passing light through the distal end towards the non-solid material. The light source is a light emitting diode. The spectrometer has a light detection circuit for receiving, through the distal end, light from the non-solid material. The tube shaped housing

contains the light source, the light detection circuit, and a printed circuit board. The printed circuit board contains electronic circuitry of the spectrometer.

The Examiner stated in the Office action (about claim 37) that the prior art does not disclose a tube shaped housing shaped to insert into a system of pipes where the tube shaped housing contains the light source, detector, a printed circuit board, and the printed circuit board contains circuitry of the fluorometer. Applicants have amended claim 23 to include these limitations.

Claim 23 as amended includes the limitations of a tube-shaped housing adapted to fit into a system of pipes, and containing the listed items. Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that the combination of Byers and Alfano does not render claim 23 unpatentable. As claims 24-27, 29 and 32 are dependent directly or indirectly on claim 23, Applicants respectfully submit that claims 24-27, 29 and 32 are patentable over the combination of Byers and Alfano for at least the reasons that were discussed above in relation to claim 23.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 23-30 and 32.

#### **VIII. Rejection of claims 23 and 31 under 35 U.S.C. § 103(a) (Shea and McMullan)**

The Examiner rejected claims 23 and 31 under 35 U.S.C. § 103(a) as being unpatentable over Shea in view of McMullan. Claims 24-32 depend directly or indirectly from claim 23. Claim 23 recites a spectrometer for measuring light from a non-solid material flowing through a system of pipes. The spectrometer has a tube-shaped housing with a distal end. The housing has a

shape adapted to insert into the system of pipes. The fluorometer has a light source for passing light through the distal end towards the non-solid material. The light source is a light emitting diode. The fluorometer has a light detection circuit for receiving, through the distal end, light from the non-solid material. The tube shaped housing contains the light source, the light detection circuit, and a printed circuit board. The printed circuit board contains electronic circuitry of the spectrometer

The Examiner stated in the Office action (about claim 37) that the prior art does not disclose a tube shaped housing shaped to insert into a system of pipes where the tube shaped housing contains the light source, detector, a printed circuit board, and the printed circuit board contains circuitry of the fluorometer. Applicants have amended claim 23 to include these limitations.

Shea describes a turbidimeter but does not teach, disclose, or suggest a tube shaped housing containing the light source, the light detection circuit and a printed circuit board with electronic circuitry of the spectrometer. McMullan discloses a light source as an LED, but neither cited reference discloses, teaches, or suggests a tube shaped housing shaped to fit into a system of pipes and containing the listed items. In contrast, claim 23 as amended does include the limitations of a tube-shaped housing with the listed items. Applicants do not surrender any equivalents of any amended limitations.

Accordingly, Applicants respectfully submit that the combination of Shea and McMullan does not render claim 23 unpatentable. As claim 31 is dependent directly on claim 23, Applicants respectfully submit that claim 31 is patentable over the combination of Shea and McMullan for at least the reasons that were discussed above in relation to claim 23.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections of claims 23 and 31.

### CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 1-15, 17-35 and 37-38 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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